CHBE 590 – Kinetics, Catalysis, and Reaction Engineering Credits 3.00

T,Th 9:25-10:40 am *Room DCH 1046* *Spring 2013*

Professor	Michael S. Wong	Room AL-B241	mswong@rice.edu
TA	Francesca Mirri	Room KH226	fm7@rice.edu
	Stacy Prukop	Room KH210	slp4@rice.edu

Overview

This course covers advanced concepts in reactor design, reaction/transport processes, multiphase reactions, chemical kinetics, and heterogeneous catalysis.

Required Textbook

James B. Rawlings and John G. Ekerdt, Chemical Reactor Analysis and Design Fundamentals, 2nd Edition (August 2012)

Recommended Textbooks

H. Scott Fogler, Elements of Chemical Reaction Engineering, 4th Ed. (2005)

Mark E. Davis and R. J. (Bob) Davis, Fundamentals of Chemical Reaction Engineering (2002)

K. J. Laidler, Chemical Kinetics, 3rd Ed. (1987)

Froment, Bischoff, and De Wilde, Chemical Reactor Analysis and Design, 3rd Ed. (2011)

J. Hagen, Industrial Catalysis: A Practical Approach (1999)

E. Bruce Nauman, Chemical Reactor Design, Optimization, and Scaleup, 2nd Ed. (2008)

Coursework and Grading

60%	8 problem sets
15%	Midterm (2 hr, take-home, closed notes, required textbook is okay; Due ~ March 5)
25%	Final exam (3 hr, part in-class, part take-home)

TA Hours

Francesca: Friday, 2-3 pm

Stacy: Friday, 10-11am

Late Homework Policy

10% off total score, for every 24-hr period after the deadline, during which the homework is turned in late.

Make-up Lectures

To be held at 4-5:15pm, Thursdays

Honor Code Students are encouraged to talk and work with one another, but each is to turn in their own unique solution set. Referring to (or copying) solution sets and test materials from any student or from other years is not allowed.

Lecture Topics

1. Isothermal ideal reactors
2. Chemical reactions – elementary; non-elementary; multiple
3. Non-isothermal ideal reactors
4. Stability analysis of non-isothermal CSTR's
5. Laminar flow reactor design
6. Residence time theory
7. Chemistry of heterogeneous catalysis
8. Reaction and diffusion in porous catalyst pellets
9. Multiphase reactions
10. Aspects of liquid-phase chemical reactions
11. Guest lecture topics from industry

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with Professor Wong during the first two weeks of class. All discussions will remain confidential. Students with disabilities will need to also contact Disability Support Services (x5841) in the Ley Student Center.